

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/840,886	CHARLESWORTH ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Huyen X. Vo	2655	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 10/3/2005.
2. ☒ The allowed claim(s) is/are 1, 3-29, 31-58, and 61-65, now amended 1-61.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

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|--|---|
| <ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</li> <li>3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br/>Paper No./Mail Date _____</li> <li>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br/>of Biological Material</li> </ol> | <ol style="list-style-type: none"> <li>5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)</li> <li>6. <input type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date _____</li> <li>7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment</li> <li>8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>9. <input type="checkbox"/> Other _____</li> </ol> |
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### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with applicant's representative on 12/16/2005. The application has been amended as follows:

**Claims 2 and 30 have been cancelled.**

**Claim 3 has been amended to depend on claim 1.**

**Claims 1, 25-27, 29, 53-55, 57-58, and 61-64 have been amended as follows:**

1. An apparatus for determining a sequence of sub-word unit labels representative of at least two word alternatives output by a word recognition unit in response to a common input word to be recognised, the apparatus comprising:

a receiver operable to receive a first sequence of sub-word unit labels representative of a first one of said at least two word alternatives output by said word recognition unit and operable to receive a second sequence of sub-word unit labels representative of a second one of said at least two word alternatives output by said word recognition unit;

an aligner operable to align and to compare sub-word unit labels of the first sequence with sub-word unit labels of the second sequence to form a number of aligned pairs of sub-word unit labels to determine a best aligned pair of sub-word unit labels; and

a processor operable to process the best aligned pair of sub-word unit labels formed by said aligner, to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the at least two word alternatives,

wherein said processor is operable to determine said output sequence of sub-word unit labels by determining, for each aligned pair of sub-word unit labels, a sub-word unit label that is confusingly similar to the first and second sub-word unit labels of the aligned pair.

25. An apparatus for determining a sequence of sub-word unit labels representative of at least two words, the apparatus comprising:

a receiver operable to receive a first sequence of sub-word unit labels representative of a first word and a second sequence of sub-word unit labels representative of a second word output by a word recognition unit in response to a common input word;

an aligner operable to align sub-word unit labels of the first sequence with sub-word unit labels of the second sequence to form a number of aligned pairs of sub-word unit labels to determine a best aligned pair of sub-word unit labels; and

a processor operable to process the best aligned pair of sub-word unit labels formed by said aligner to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the first and second sequences of sub-word unit labels by determining, for each aligned pair of sub-word unit labels, a sub-word unit label that is confusingly similar to the sub-word unit labels of the aligned pair.

26. An apparatus for determining a sequence of sub-word unit labels representative of at least two word alternatives output by a word recognition unit in response to a common input word to be recognised, the apparatus comprising:

a receiver operable to receive the at least word alternatives output by the word recognition unit;

a generator operable to generate, for each received word alternative, a sequence of sub-word unit labels representative of the word alternative;

an aligner operable to align and compare the sub-word unit labels of each generated sequence of sub-word unit labels to form a number aligned groups of sub-word unit labels to determine a best aligned group of sub-word unit labels; and

a processor operable to process the best aligned group of sub-word unit labels formed by said aligner, to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the received word alternatives,

wherein said processor is operable to determine said output sequence of sub-word unit labels by determining, for each aligned group of sub-word unit labels, a sub-word unit label that is confusingly similar to the first and second sub-word unit labels of the aligned pair.

27. An apparatus for determining a sequence of sub-word unit labels representative of at least two word alternatives output by a word recognition unit in response to a common input word to be recognised, the apparatus comprising:

a receiver operable to receive the at least two word alternatives output by the word recognition unit;

a generator operable to generate, for each received word alternative, a sequence of sub-word unit labels representative of the received word alternative;

an aligner operable to align and compare the sub-word unit labels of each generated sequence of sub-word unit labels to form a number aligned groups of sub-word unit labels to determine a best aligned group of sub-word unit labels; and

a processor operable to process the best aligned group of sub-word unit labels formed by said aligner, to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the at least two word alternatives by determining, for each aligned group of sub-word unit labels, a sub-word unit label that is confusingly similar to the sub-word unit labels of the group.

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29. A method of determining a sequence of sub-word unit labels representative of at least two word alternatives output by a word recognition unit in response to a common input word to be recognised, the method comprising:

receiving a first sequence of sub-word unit labels representative of a first one of said at least two word alternatives output by said word recognition unit;

receiving a second sequence of sub-word unit labels representative of a second one of said at least two word alternatives output by said word recognition unit;

aligning and comparing sub-word unit labels of the first sequence with sub-word unit labels of the second sequence to form a number of aligned pairs of sub-word unit labels to determine a best aligned pair of sub-word unit labels; and

processing the best aligned pair of sub-word unit labels formed in said aligning step, to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the at least two word alternatives,

wherein said processing step determines said output sequence of sub-word unit labels by determining, for each aligned pair of sub-word unit labels, a sub-word unit label that is confusingly similar to the first and second sub-word unit labels of the aligned pair.

53. A method of determining a sequence of sub-word unit labels representative of at least two words output by a word recognition unit in response to a common input word to be recognised, the method comprising:

receiving a first sequence of sub-word unit labels representative of a first word of said at least two words;

receiving a second sequence of sub-word unit labels representative of a second word of said at least two word;

aligning sub-word unit labels of the first sequence with sub-word unit labels of the second sequence to form a number of aligned pairs of sub-word unit labels to determine a best aligned pair of sub-word unit labels; and

processing the best aligned pair of sub-word unit labels formed in said aligning step, to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the first and second sequences of sub-word unit labels by determining, for each aligned pair of sub-word unit labels, a sub-word unit label that is confusingly similar to the sub-word unit labels of the aligned pair.

54. A method of determining a sequence of sub-word unit labels representative of at least two word alternatives output by a word recognition unit in response to a common input word to be recognised, the method comprising:

receiving the at least two word alternatives output by the word recognition unit;

generating, for each received word alternative, a sequence of sub-word unit labels representative of the word alternative;

aligning and comparing the sub-word unit labels of each generated sequence of sub-word unit labels to ~~from~~<sup>form</sup> a number of aligned groups of sub-word unit labels to determine a best aligned group of sub-word unit labels; and

processing the best aligned group of sub-word unit labels formed in said aligning and comparing step to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the received word alternatives,

wherein said processing step determines said output sequence of sub-word unit labels by determining, for each aligned group of sub-word unit labels, a sub-word unit label that is confusingly similar to the first and second sub-word unit labels of the aligned pair.

55. A method of determining a sequence of sub-word unit labels representative of at least two word alternatives output by a word recognition unit in response to a common input word to be recognised, the method comprising:

receiving the at least two word alternatives output by the word recognition unit;  
generating, for each received word alternative, a sequence of sub-word unit labels representative of the word alternative;

aligning and comparing the sub-word unit labels of each generated sequence of sub-word unit labels to form a number of aligned groups of sub-word unit labels to determine a best aligned group of sub-word unit labels; and



processing the best aligned group of sub-word labels formed in said aligning and comparing step to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the at least two word alternatives by determining, for each aligned group, a sub-word unit label that is confusingly similar to the sub-word unit labels of the group.

57. A computer readable medium storing computer executable process steps to perform a method of determining a sequence of sub-word unit labels representative of at least two word alternatives output by a word recognition unit in response to a common input word to be recognised, the process steps comprising:

steps for receiving a first sequence of sub-word unit labels representative of a first one of said at least two word alternatives output by said word recognition unit;

steps for receiving a second sequence of sub-word unit labels representative of a second one of said at least two word alternatives output by the word recognition unit;

steps for aligning and comparing sub-word unit labels of the first sequence with sub-word unit labels of the second sequence to form a number of aligned pairs of sub-word unit labels to determine a best aligned pair of sub-word unit labels; and

steps for processing the best aligned pair of sub-word unit labels formed in said aligning and comparing step to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the at least two word alternatives,

wherein said steps for processing determines said output sequence of sub-word unit labels by determining, for each aligned pair of sub-word unit labels, a sub-word unit label that is confusingly similar to the first and second sub-word unit labels of the aligned pair.

58. A computer executable program stored on a computer readable medium, the computer executable program for controlling a processor to perform a method of determining a sequence of sub-word unit labels representative of at least two word alternatives output by a word recognition unit in response to a common input word to be recognised, the program comprising:

- code for receiving a first sequence of sub-word unit labels representative of a first one of said at least two word alternatives output by the word recognition unit;

- code for receiving a second sequence of sub-word unit labels representative of a second one of said at least two word alternative output by the word recognition unit;

- code for aligning and comparing sub-word unit labels of the first sequence with sub-word unit labels of the second sequence to form a number of aligned pairs of sub-word unit labels to determine a best aligned pair of sub-word unit labels, and

- code for processing the best aligned pair of sub-word unit labels formed by said aligning and comparing code to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the at least two word alternatives,

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wherein said code for processing determines said output sequence of sub-word unit labels by determining, for each aligned pair of sub-word unit labels, a sub-word unit label that is confusingly similar to the first and second sub-word unit labels of the aligned pair.

61. An apparatus for determining a sequence of sub-word unit labels representative of at least two word alternatives output by a word recognition unit in response to a common input word to be recognised, the apparatus comprising:

means for receiving a first sequence of sub-word unit labels representative of a first one of said at least two word alternatives output by said word recognition unit and for receiving a second sequence of sub-word unit labels representative of a second one of said at least two word alternatives output by said word recognition unit;

means for aligning and for comparing sub-word unit labels of the first sequence with sub-word labels of the second sequence to form a number of aligned pairs of sub-word unit labels to determine a best aligned pair of sub-word unit labels; and

means for processing the best aligned pair of sub-word unit labels formed by said aligning means to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the least two word alternatives.

wherein said means for processing determines said output sequence of sub-word unit labels by determining, for each aligned pair of sub-word unit labels, a sub-word unit

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label that is confusingly similar to the first and second sub-word unit labels of the aligned pair.

62. An apparatus for determining a sequence of sub-word unit labels representative of at least two words output by a word recognition unit in response to a common input word to be recognised, the apparatus comprising:

means for receiving a first sequence of sub-word unit labels representative of a first word and for receiving a second sequence of sub-word unit labels representative of a second word;

means for aligning sub-word unit labels of the first sequence with sub-word unit labels of the second sequence to form a number aligned pairs of sub-word unit labels to determine a best aligned pair of sub-word unit labels; and

means for processing the best aligned pair of sub-word unit labels formed by said aligning means to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the first and second sequence of sub-word unit labels by determining, for each aligned pair of sub-word unit labels, a sub-word unit label that is confusingly similar to the sub-word unit labels of the aligned pair.

63. An apparatus for determining a sequence of sub-word unit labels representative of at least two word alternatives output by a word recognition unit in response to a common input word to be recognised, the apparatus comprising:

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means for receiving the at least two word alternatives output by the word recognition unit;

means for generating for each received word alternative, a sequence of sub-word unit labels representative of the word alternative;

means for aligning and comparing the sub-word unit labels of each generated sequence of sub-word unit labels to form a number aligned groups of sub-word unit labels to determine a best aligned group of sub-word unit labels; and

means for processing the best aligned group of sub-word unit labels formed by said aligning means, to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the received word alternatives,

wherein said means for processing determines said output sequence of sub-word unit labels by determining, for each aligned group of sub-word unit labels, a sub-word unit label that is confusingly similar to the first and second sub-word unit labels of the aligned pair.

64. An apparatus for determining a sequence of sub-word unit labels representative of at least two word alternatives output by a word recognition unit in response to a common input word to be recognised, the apparatus comprising:

means for receiving the at least two word alternatives output by the word recognition unit;

means for generating, for each received word alternative, a sequence of sub-word unit labels representative of the received word alternative;

means for aligning and comparing the sub-word unit labels of each generated sequence of sub-word unit labels to form a number aligned groups of sub-word unit labels to determine a best aligned group of sub-word unit labels; and

means for processing the best aligned group of sub-word unit labels formed by said aligning means to determine an output sequence of sub-word unit labels which is different from the first and second sequences of sub-word unit labels and which is representative of the at least two word alternatives by determining, for each aligned group of sub-word unit labels, a sub-word unit label that is confusingly similar to the sub-word unit labels of the group.

### ***Allowable Subject Matter***

2. Claims 1, 3-29, 31-58, and 61-65 are allowed over prior art of record. The following is an examiner's statement of reasons for allowance: Fakhr et al. (US 6006182) disclose a system and method consistent with the present invention determine whether to accept one of a plurality of intermediate recognition results output by a speech recognition system as a final recognition result. The system first combines a plurality of speech rejection features into a feature function in which weights are assigned to each rejection feature in accordance with a recognition accuracy of each rejection feature. Feature values are then calculated for each of the rejection features using the plurality of intermediate recognition results. The system next computes the

feature function according to the calculated feature values to determine a rejection decision value. Finally, one of the plurality of intermediate recognition results is accepted as the final recognition result according to the rejection decision value (*referring to reference*). Baker (US 6122613) teaches a system having at least two speech recognizers, each of which has a different performance characteristic. One speech recognizer may be a large-vocabulary, continuous speech recognizer optimized for real-time responsiveness and another speech recognizer may be an offline recognizer optimized for high accuracy. The speech content of the sample is recognized based on processing results from the speech recognizers. Sets of candidates produced by the two recognizers may be combined by merging the scores to generate a combined set of candidates that corresponds to the union of the two sets. Offline processing may be performed based on input from a human operator, cost, processing times, confidence levels, or importance. Uncertainty for a candidate may occur when a difference between a score for a best scoring candidate and a score for a second best scoring candidate is less than a threshold value. A graphic user interface may allow the user to selectively transmit the speech sample to another speech recognizer (or restrict such transmission), based on document type or availability of the second speech recognizer (*referring to reference*).

Both Fakhr et al. and Baker fail to specifically disclose ~~a~~ the step of aligning two sequences of sub-word unit labels representative of the first and second alternative word candidates output by the recognition unit in response to a common input word, to form a number of alignment pairs to determine a best aligned pair for further processing

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to determine an output sequence of sub-word unit labels that is different from the first and second sequences of sub-word unit labels. Both Fakhr et al. and Baker also fail to specifically disclose second comparator operable to compare, for each aligned pair, the second sequence sub-word unit label in the aligned pair with each of said plurality of sub-word unit labels from the set, to provide a further corresponding plurality of comparison scores representative of the similarities between said second sequence sub-word unit label and the respective sub-word unit labels of the set; a combiner operable to combine the comparison scores obtained when comparing the first and second sequence sub-word unit labels in the aligned pair with the same sub-word unit label from the set, to generate a plurality of combined comparison scores; third comparator operable to compare, for each aligned pair, the combined comparison scores generated by said combiner for the aligned pair; and a determiner operable to determine, for each aligned pair of sub-word unit labels, a sub-word unit label representative of the sub-word unit labels in the aligned pair in dependence upon a comparison result output by said third comparator for the aligned. Furthermore, it would have not been obvious to one of ordinary skill in the art at the time of invention to modify Fakhr et al. in order to obtain the claimed invention. Therefore, claims 1, 3-29, 31-58, and 61-65 are allowed over prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."



***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huyen X. Vo whose telephone number is 571-272-7631. The examiner can normally be reached on M-F, 9-5:30.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571-272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HXV

12/16/2005

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SUSAN MCFADDEN  
PRIMARY EXAMINER